We claim:

1. A single mode optical waveguide fiber comprising:

a core glass region comprising a first circular central segment, having a relative index $\Delta_0\%$ and a radius r_0, a first annular segment surrounding and in contact with the central segment, having a relative index $\Delta_1\%$ and a radius r_1, and a second annular segment surrounding and in contact with the first annular segment, having a relative index $\Delta_2\%$, a radius r_2, and a width w_2, the respective segments each having a refractive index profile;

a clad glass layer having a refractive index profile and a minimum refractive index n_c, wherein n_c is the reference index for the relative index of each core segment;

in which the index profile of the central segment is an a profile having α in the range of about 0.7 to 2, the index profile of the first annular segment is substantially flat, the index profile of the second annular segment is a rounded step, and $\Delta_0\%>\Delta_2\%>\Delta_1\%$,

the values of the respective Δ's and radii being chosen so that the inner profile volume is in the range 2.28 to 3.26% μm^2, the outer profile volume is in the range 3.70 to 13.75% μm^2 and the ratio of outer to inner volume is in the range 1.5 to 4.3.

2. The single mode waveguide of claim 1 in which $\Delta_0\%$ is in the range 1.01% to 1.35%, $\Delta_1\%$ is in the range 0.03% to 0.21%, and $\Delta_2\%$ is in the range 0.12% to 0.61%.

3. The single mode waveguide of claim 2 in which r_0 is in the range 2.06 μm to 2.80 μm, r_1 is in the range 4.55 μm to 8.94 μm, and w_2 is in the range 0.01 μm to 2.0 μm.

4. The single mode waveguide of claim 1 in which the circular central segment has a refractive index indent at the center of the circular segment, the index indent having the approximate shape of an inverted cone, the indent having a minimum relative index in the range of about 0.5% to 0.7% and the radius of the base of the inverted cone shape is no greater than about 0.7 μm.

5. The single mode waveguide of claim 1 in which the total dispersion over the wavelength range 1530 nm to 1565 nm is positive and no greater than 6.5 ps/nm-km, the effective area is not less than 60 μm^2, and mode field diameter is in the range of 9 μm to 10 μm.

6. The single mode waveguide of claim 5 in which the cut off wavelength measured on waveguide fiber which has been placed in cable form is less than 1470 nm, the attenuation at 1550 nm is less than 0.22 dB/km, the induced loss under pin array bend testing is less than 16 dB and the induced loss under lateral load bend testing is less than 0.8 dB/m.

7. A single mode optical waveguide fiber comprising:

a core glass region comprising a first circular central segment, having a relative index $\Delta_0\%$ and a radius r_0, a first annular segment surrounding and in contact with the central segment, having a relative index $\Delta_1\%$ and a radius r_1, and a second annular segment surrounding and in contact with the first annular segment, having a relative index $\Delta_2\%$, a radius r_2, and a width w_2, the respective segments each having a refractive index profile;

a clad glass layer having a refractive index profile and a minimum refractive index n_c, wherein n_c is the reference index for the relative index of each core segment;

in which the index profile of the central segment is an a profile having α about equal to 1, the index profile of the first annular segment is substantially flat, the index profile of the second annular segment is a rounded step, and $\Delta_0\%>\Delta_2\%>\Delta_1\%$, and,

$\Delta_0\%$ is in the range 1.11% to 1.35%, $\Delta_1\%$ is in the range 0.03% to 0.14%, and $\Delta_2\%$ is in the range 0.12% to 0.50%, and,

r_0 is in the range 2.06 μm to 2.45 μm, r_1 is in the range 4.55 μm to 6.29 μm, and w_2 is in the range 0.7 μm to 2.0 μm, and

the inner profile volume is in the range 2.28 to 3.00% μm^2, the outer profile volume is in the range 3.70 to 8.12% μm^2, and the ratio of outer to inner volume is in the range 1.5 to 2.9.

8. The single mode waveguide of claim 7 in which the circular central segment has a refractive index indent at the center of the circular segment, the index indent having the approximate shape of an inverted cone, the indent having a minimum relative index in the range of about 0.5% to 0.7% and the radius of the base of the inverted cone shape is no greater than about 0.7 μm.

9. A single mode optical waveguide fiber comprising a core region having a central segment having index of refraction Δ_0, a first annular segment having index of refraction Δ_1, and a second annular segment having index of refraction Δ_2, wherein Δ_0 is greater than either Δ_1 or Δ_2, the refractive index profile of the fiber tailored to result in said fiber exhibiting the following properties:

a zero dispersion wavelength outside the wavelength region 1530-1565 nm;

an effective area of at least 60 μm^2 ;

a cable cutoff wavelength less than about 1470 nm; and

a mode field diameter in the range of 9 μm to 10 μm.

10. The single mode fiber of claim 9, wherein said fiber exhibits positive dispersion over the wavelength region 1530-1565 nm.

11. The single mode fiber of claim 9, wherein said central segment comprises an α profile segment in which α is in the range of 0.7 to 2.0.

12. The single mode fiber of claim 10, wherein said central segment comprises an α profile segment in which α is in the range of 0.7 to 2.0.

13. The single mode waveguide fiber of claim 9, further comprising an attenuation at 1550 μm which is less than 0.22 dB/km.

14. The single mode waveguide fiber of claim 10, further comprising an attenuation at 1550 μm which is less than 0.22 dB/km.

15. The single mode waveguide fiber of claim 11, further comprising an attenuation at 1550 μm which is less than 0.22 dB/km.

16. The single mode waveguide fiber of claim 9, comprising an induced loss under pin array bend testing of less than 16 dB.

17. The single mode waveguide fiber of claim 10, comprising an induced loss under pin array bend testing of less than 16 dB.

18. The single mode waveguide fiber of claim 11, comprising an induced loss under pin array bend testing of less than 16 dB.

19. The single mode waveguide fiber of claim 13, comprising an induced loss under pin array bend testing of less than 16 dB.

20. The single mode waveguide fiber of claim 15, comprising an induced loss under lateral load testing of less than 0.8 dB/m.

21. The single mode waveguide fiber of claim 9, comprising a dispersion at 1530 nm which is greater than 1 ps/nm-km.

22. The single mode waveguide fiber of claim 11, comprising a dispersion at 1530 nm which is greater than 1 ps/nm-km.

23. The single mode waveguide fiber of claim 13, comprising a dispersion at 1530 nm which is greater than 1 ps/nm-km.

24. The single mode waveguide fiber of claim 15, comprising a dispersion at 1530 nm which is greater than 1 ps/nm-km.

25. The single mode waveguide fiber of claim 20, comprising a dispersion at 1530 nm which is greater than 1 ps/nm-km.

26. The single mode waveguide fiber of claim 9, wherein said fiber comprises a dispersion over the wavelength region 1530 nm to 1565 nm which is positive and no greater than 6.5 ps/nm-km.

27. The single mode waveguide fiber of claim 11, wherein said fiber comprises a dispersion over the wavelength region 1530 nm to 1565 nm which is positive and no greater than 6.5 ps/nm-km.

28. The single mode waveguide fiber of claim 13, wherein said fiber comprises a

dispersion over the wavelength region 1530 nm to 1565 nm which is positive and no greater than 6.5 ps/nm-km.

29. The single mode waveguide fiber of claim 15, wherein said fiber comprises a dispersion over the wavelength region 1530 nm to 1565 nm which is positive and no greater than 6.5 ps/nm-km.

30. The single mode waveguide fiber of claim 19, wherein said fiber comprises a dispersion over the wavelength region 1530 nm to 1565 nm which is positive and no greater than 6.5 ps/nm-km.

31. The single mode waveguide fiber of claim 25, wherein said fiber comprises a dispersion over the wavelength region 1530 nm to 1565 nm which is positive and no greater than 6.5 ps/nm-km.

32. The single mode waveguide fiber of claim 9, wherein said fiber exhibits a cable cutoff wavelength less than about 1360 nm.

33. The single mode waveguide fiber of claim 11, wherein said fiber exhibits a cable cutoff wavelength less than about 1360 nm.

34. The single mode waveguide fiber of claim 15, wherein said fiber exhibits a cable cutoff wavelength less than about 1360 nm.

35. The single mode waveguide fiber of claim 19, wherein said fiber exhibits a cable cutoff wavelength less than about 1360 nm.

36. The single mode waveguide fiber of claim 31, wherein said fiber exhibits a cable cutoff wavelength less than about 1360 nm.